

Technical Bulletin

TEOM 1405F, TEOM 1405DF, 8500 FDMS 24-hour baseline test

Bulletin# TS0020

Rev 08/2011

Description:

Unit reports higher than expected concentrations when compared with co-located instruments, field testing can be performed to confirm artifacts within the system influencing a high bias on the mass concentration.

Determining Cause:

1. Perform the chiller cleaning process. The 1405F/DF has a cooler cleaning wizard. The 8500C has a new cleaning process using the configuration utility (see technical note on the-online library). The 8500B and updated B to C do not have a software controlled process for cleaning, for these variants, please contact Thermo Fisher Scientific representative for assistance.
2. Confirm that the unit is leak-free from sample to purge lines.
3. Confirm that the dryer has been serviced within the last 18 months
4. Confirm that the system is supplying sufficient vacuum pressure
5. If after validating that steps 1-4 are complete and a bias still exists, run a field test baseline.

Setup Field Baseline Test:

Materials needed:

1. In-line filter, or 47mm filter in a sealed holder will be sufficient. Two filters are need for the 1405DF or a 'TEE' connection to the two main sample lines.
2. Charcoal scrubber; preferably one that does not add significant pressure drop on the main flow. Example: use a tube holder like a desiccant holder, but with activated charcoal loaded with 3/8 to 1/2 openings on the ends of the tube. Two scrubbers are need for the 1405DF or a 'TEE' connection to the two main sample lines.

Setup:

- a. Remove the extended sample line from the top of the unit to access ½ inch sample line(s) coming out of the top of the 8500 FDMS or 1405F/DF enclosure
- b. Install the in-line filter and charcoal scrubber in that order to the top of the ½ inch sample line extending from the top of the 8500 FDMS or the 1405F/DF sample lines.
- c. Change the internal data logging to collect specific parameters for baseline testing.

Internal Storage Setup:

8500 FDMS:

1. Go to the storage screen using the direct key <Store> or by selecting 'Storage' from the list of screens.
2. From the 'View Storage Screen' press <Step screen> key to go to the 'Set Storage Screen'
3. Using the arrow keys up and down scroll to the first variable in the list.
4. To change the parameter you must press the <edit> key and enter the Program Register Code (PRC) or use the arrow keys to scroll through the possible selections. Once you have the parameter selected press <enter> to save the setting.
5. Recommended parameters:
 - a) Mass Concentration PRC 8
 - b) Base MC PRC 102
 - c) Reference MC PRC 104
 - d) Status PRC 41
 - e) Pressure Drop PRC 35
 - f) Sample Dewpoint PRC 99
6. Recommended interval for the storage is 360 seconds.

1405F:

- 1) Go to the <Settings> menu item <Data Storage>
- 2) Select <Edit List>
- 3) Recommended Parameters:
 - a) Mass Concentration
 - b) Base_MC
 - c) Reference_MC
 - d) System Status
 - e) Dryer Dewpoint
 - f) Filter Loading
 - g) Vacuum Pressure
- 4) Recommended interval for storage is 360 seconds.

1405DF:

1. Go to the <Settings> menu item<Data Storage>
2. Select <Edit List>
3. Recommended Parameters:
 - a) PM2.5 MC
 - b) PM2.5 Base_MC
 - c) PM2.5 Reference_MC
 - d) Coarse MC
 - e) Coarse Base_MC
 - f) Coarse Reference_MC
 - g) System Status
 - h) PM 2.5 Dryer Dewpoint
 - i) Coarse Dryer Dewpoint
 - j) PM 2.5 Filter Load
 - k) Coarse Filter Load
 - l) Vacuum Pressure
4. Recommended interval for storage is 360 seconds.

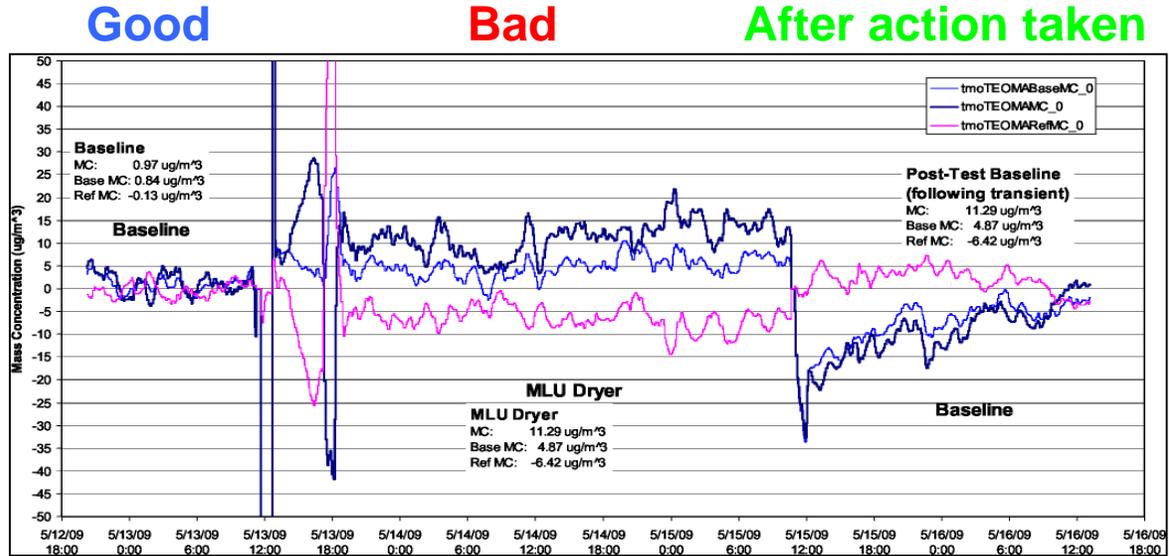
Run Baseline test for at least 24 hours:

1. After 24 hours of operation download data from instrument
 - a) The 8500 download option is through the serial port using RPCOMM
 - b) The 1405F/DF download options are serial using RPCOMM, USB using a memory stick or Ethernet using ePort communication software.
2. Manuals for these instruments describe how to download data using the various options.

Reviewing the data

1. Files downloaded from all instruments can be opened using Microsoft Excel
2. Once the file has been opened create charts of the three types of concentrations collected MC, BaseMC and Reference MC.
3. Review the data for status, dewpoints and filter loading for any indication of instability or other problems.
4. The concentrations should compare in such a manner that all three levels are centered about 'Zero' and fluctuate between +/- 5 ug/m³ for a clean system free of artifacts and no bias.
5. If the three concentration levels are not centered about 'zero'; The Reference MC is negative indicating semi volatile measurements, the Base MC is positive indicating an accumulating particulate component and the MC is the resultant more positive; then the unit is indicating some form of artifact within the system.

EXAMPLE: of a worn out dryer.



High Bias Source or Artifact:

1. Possible Dryer replacement needed
2. Chiller cleaning may be required; see instruction above in determining causes.
3. The switching valve may be contaminated or new seals and o-rings may be needed.
4. Tubing contamination may exist; replace or clean the tubes carrying sample from dryer to valve and valve to chiller round trip.
5. The heated air tube section above the mass transducer should be cleaned.
6. Replace or check seals in mass transducer above the filter area.